UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,813	10/07/2003	Jae-Young Ahn	8054-13 DIV (AW7031 US/MJ	4781

22150 7590 10/08/2004

F. CHAU & ASSOCIATES, LLC
130 WOODBURY ROAD
WOODBURY, NY 11797

EXAMINER	
BREWSTER, WILLIAM M	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 10/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	**Applicant(s)**	
10/680,813	AHN ET AL.	
Examiner	**Art Unit**	
William M. Brewster	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10* is/are allowed.

6)☒ Claim(s) *1-4,7-9,11,12,19 and 20* is/are rejected.

7)☒ Claim(s) *6 and 13-18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-5, 7, 19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,660,587 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because both have forming an oxide and performing a re-oxidation process by chlorine-including gas while restraining the thickness of the oxide layer while claiming the same percentage of chlorine-gases, temperature, pressure, timing of gas supplies, and chlorine reactants.

Applicant argues that the doctrine of double patenting cannot be employed for withdrawn claims. Examiner agrees, however, the double patenting rejection pertains to the allowed claims found in U.S. Patent No. 6,660,587 B1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1, 8, 11, 12, 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Akram et al., U.S. Patent No. 6,288,433 B1.

Akram anticipates a method for forming a gate electrode in a semiconductor device, the method comprising the steps of:

i) in fig. 4, forming a preliminary gate electrode 20 on a semiconductor substrate 12, the preliminary gate electrode including a gate oxide layer 16c, pattern and a conductive layer 20 pattern stacked on the gate oxide layer pattern;

limitations from claim 8: wherein the conductive layer pattern 20 is comprised of polysilicon doped with impurities: col. 3, lines 30-42;

limitations from claims 11, 12: further comprising the step of forming a metal silicide layer 30 pattern on the conductive layer pattern; wherein the metal silicide layer pattern is any one selected from the group consisting of tungsten silicide (WSi) pattern, cobalt silicide (CoSi) pattern, titanium silicide (TiSix) pattern, and tantalum silicide (TaSix) layer pattern: WSi, col. 3, lines 30-42;

and ii) performing a re-oxidation process for curing damage of at least one of the semiconductor substrate and a sidewall of the conductive layer pattern: sidewall of the conductive layer pattern 44, when the preliminary gate electrode is formed by forming an oxide layer on an outer surface of the preliminary gate electrode and on the semiconductor substrate, by supplying an oxygen gas and a chlorine-including gas while restraining a thickness of the gate oxide layer pattern from being increased, col. 5, lines 4-15;

limitations from claim 20, further comprising restraining a thickness of a dielectric

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 3, 4, 7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram as applied to claims 1, 8, 11, 12 above, and further in view of Niino et al., U.S. Patent No. 5,500,388.

Akram does not specify the type of chlorine used in forming the oxide on the sidewall, Niino does specify the chlorine gas. Niino specifies in fig. 14, forming oxide 202 by simultaneously depositing O_2 gas and HCl gas. Niino gives motivation in col. 3, lines 12-20. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Niino's process with Akram's invention would have been beneficial because Niino's process helps increase the quality of the oxide and throughput of the devices with it.

Neither Akram nor Jia specify the percentage of the volume of the chlorine-including gas, the temperature range, the pressure range, or the thickness of the oxide layer after the re-oxidation process has been performed. As Akram indicates in col. 6, lines 26-36, the practitioner may optimize these parameters.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentablility to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art . . . such ranges are termed 'critical ranges' and the applicant has the burden of proving such criticality . . . More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

> In re Aller 105 USPQ 233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 19, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram as applied to claims 1, 8, 11, 12 above, and further in view of Kokubu, U.S. Patent No. 6,200,858 B1.

Akram does not specify protecting a tunnel oxide, but Kokubu does. Kokubu teaches in fig. 5, the method further comprising restraining a thickness of a tunnel oxide layer 2 pattern from being increased; and further comprising restraining a thickness of a dielectric interlayer pattern 4 from being increased, col. 5, lines 17-57. Kokubu gives motivation in col. 1, line 66 - col. 2, line 2. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Kokubu's process with Akram's invention would have been beneficial because the invention provides for an EEPROM which the data can be written faster and the rewriting is improved.

Allowed Claims

Claim 10 is allowed.

The following is an examiner's statement of reasons for allowance: claim 10, substeps a-g cannot be found in the prior art of record.

Claims 6, 13-17 are objected to as being dependent upon a rejected base claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 27 September 2004 have been fully considered but they are not persuasive. Applicant argues that Akram's spacers restrain the gate oxide's width, but does not anticipate the restraining the oxide's growing thicker.

Examiner disagrees. It has been held that applicant's are not required to disclose all the inherent science or features of their inventions. Indeed, such a requirement would make applications unreasonably long and unwieldy. Furthermore, the task to write every single feature or absence of one would be infinite. With this policy in place, Akram meets the features of forming an oxide layer 16C, a preliminary gate electrode 20, forming an oxide layer on an outer surface of the preliminary gate electrode and supplying an oxygen gas and a chlorine-including gas while restraining a thickness of the gate oxide layer pattern from being increased. Neither Akram's description nor figures display the oxide layer becoming wider or thicker. Akram further has all the structure features of the applicant's claim 1. Specifically, Akram's oxide layer prevents reactants from reaching the oxide layer to increase its width. Therefore Akram forms parallel structure produces parallel performance of restraining the thickness of the oxide feature.

Examiner must give claims their broadest reasonable interpretation, MPEP §2111, "During patent examination, the pending claims must be 'given the broadest reasonable interpretation consistent with the specification.' Applicant always has the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified, *In re Pratter*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969), *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997)." Also see *In re Zletz*, 13 USPQ 2d. 1320 (Fed. Cir. 1989).

For the above reasons, the rejection is deemed proper.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William M. Brewster whose telephone number is 571-272-1854. The examiner can normally be reached on Full Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William M. Brewster

WB
6 October 2004